

We claim:

1. A catalyst composition which comprises a transition metal complex, an activator, and an allylic alcohol-containing polymer.
2. The composition of claim 1 wherein the complex, the activator, or both, is supported onto the polymer.
3. The composition of claim 1 wherein the allylic alcohol is selected from the group consisting of allyl alcohol, methallyl alcohol, and alkoxlates thereof.
4. The composition of claim 1 wherein the polymer further comprises recurring units selected from the group consisting of alkyl acrylates and methacrylates, vinyl aromatics, vinyl halides, vinyl ethers, vinyl esters, unsaturated nitriles, allyl esters, allyl ethers, allyl carbonates, conjugated dienes, and mixtures thereof.
5. The composition of claim 1 wherein the polymer is selected from the group consisting of styrene-allyl alcohol copolymers, styrene-methallyl alcohol copolymers, styrene-allyl alcohol alkoxylate copolymers, styrene-methallyl alcohol alkoxylate copolymers, α -alkyl styrene-allyl alcohol copolymers, α -alkyl styrene-methallyl alcohol copolymers, α -alkyl styrene-allyl alcohol alkoxylate copolymers, α -alkyl styrene-methallyl alcohol alkoxylate copolymers, p -alkyl styrene-allyl alcohol copolymers, p -alkyl styrene-methallyl alcohol copolymers, p -alkyl styrene-allyl alcohol alkoxylate copolymers, p -alkyl styrene-methallyl alcohol alkoxylate copolymers, and mixtures thereof.
6. The composition of claim 1 wherein the polymer is a styrene-allyl alcohol copolymer.
7. The composition of claim 1 wherein the transition metal complex has the general structure:



wherein M is a transition metal; X is independently selected from the group consisting of hydrogen, halides, C₁₋₁₀ hydrocarbyls, C₁₋₁₀ alkoxys, and C₆₋₁₀ aryloxys; L is independently selected from the group consisting of

substituted or unsubstituted cyclopentadienyls, boraaryls, pyrrolyls, azaborolinyls, quinolinyls, indenoindolyls, and phosphinimines; the sum of m and n equals to the valence of M; and two L ligands are optionally bridged.

8. The composition of claim 1 wherein the activator is selected from the group consisting of alumoxanes, alkyl aluminums, alkyl aluminum halides, anionic compounds of boron or aluminum, trialkylboron compounds, triarylboron compounds, and mixtures thereof.

9. The composition of claim 1 wherein the activator is an alumoxane.

10. A process which comprises polymerizing an olefin in the presence of a catalyst composition comprising a transition metal complex, an activator, and a polymer comprising recurring unit of an allylic alcohol.

11. The process of claim 10 wherein the complex, the activator, or both, is supported onto the polymer.

12. The process of claim 10 wherein the allylic alcohol is selected from the group consisting of allyl alcohol, methallyl alcohol, and alkoxylates thereof.

13. The process of claim 10 wherein the polymer further comprises recurring units selected from the group consisting of alkyl acrylates and methacrylates, vinyl aromatics, vinyl halides, vinyl ethers, vinyl esters, unsaturated nitriles, allyl esters, allyl ethers, allyl carbonates, conjugated dienes, and mixtures thereof.

14. The process of claim 10 wherein the polymer is selected from the group consisting of styrene-allyl alcohol copolymers, styrene-methallyl alcohol copolymers, styrene-allyl alcohol alkoxylate copolymers, styrene-methallyl alcohol alkoxylate copolymers, α -alkyl styrene-allyl alcohol copolymers, α -alkyl styrene-methallyl alcohol copolymers, α -alkyl styrene-allyl alcohol alkoxylate copolymers, α -alkyl styrene-methallyl alcohol alkoxylate copolymers, *p*-alkyl styrene-allyl alcohol copolymers, *p*-alkyl styrene-methallyl alcohol copolymers, *p*-alkyl styrene-allyl alcohol alkoxylate copolymers, *p*-alkyl styrene-methallyl alcohol alkoxylate copolymers, and mixtures thereof.

15. The process of claim **10** wherein the polymer is a styrene-allyl alcohol copolymer.

16. The process of claim **10** wherein the transition metal complex has the general structure:



wherein M is a transition metal; X is independently selected from the group consisting of hydrogen, halides, C₁₋₁₀ hydrocarbyls, C₁₋₁₀ alkoxys, and C₆₋₁₀ aryloxys; L is independently selected from the group consisting of substituted or unsubstituted cyclopentadienyls, boraaryls, pyrrolyls, azaborolinyls, quinolinyls, indenoindolyls, and phosphinimines; the sum of m and n equals to the valence of M; and two L ligands are optionally bridged.

17. The process of claim **10** wherein the activator is selected from the group consisting of alumoxanes, alkyl aluminums, alkyl aluminum halides, anionic compounds of boron or aluminum, trialkylboron compounds, triarylboron compounds, and mixtures thereof.

18. The process of claim **10** wherein the transition metal complex has at least one indenoindolyl ligand.

19. The process of claim **10** wherein the activator is selected from the group consisting of alumoxanes, trialkyl aluminums, and mixtures thereof.

20. The process of claim **10** wherein the olefin is a C₂₋₁₀ α-olefin.

21. A polyolefin made by the process of claim **10**.